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Docket No.: 501.43789X00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

Ryoji FURUHASHI et al.

Serial No.   10/828,306

Filed: April 21, 2004

For: INFORMATION PROCESSING SYSTEM AND MANAGEMENT
              DEVICE

SUPPLEMENTAL PETITION TO MAKE SPECIAL
UNDER 37 CFR §1.102(MPEP §708.02)

June 10, 2005

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Supplemental to the Petition to Make Special filed on May 18, 2005,

Applicants submit the following additional remarks.

It is submitted that the cited references, whether considered alone or in

combination, fail to disclose or suggest the invention as claimed. In particular,

the cited references, at a minimum, fail to disclose or suggest in combination with

the other limitations recited in the claims:

a first feature of the present invention as recited in independent claim 1

including acquiring the level of storage characteristics in the storage destination

required by the data at a prescribed time, for each data item managed by said

data storage destination managing means, and acquiring the level of storage

characteristics of said physical storage region in which said data is actually

stored, and comparing said respective levels, and issuing an instruction to said storage device for said data to be moved to said physical storage region providing said required storage characteristics;

a second feature of the present invention as recited in independent claim 11 including comparing the level of the storage characteristics of a storage destination required by the data at a particular time, at prescribed times, for each data item, with the level of the storage characteristics of said physical storage region in which said data is actually stored, and if said levels are not matching, then it sends an instruction for said data to be moved to said physical storage region providing said required storage characteristics, to the storage device having said physical storage region in which said data is actually stored;

a third feature of the present invention as recited in independent claim 17 including comparing said storage characteristics level required by said data at a particular time, with said storage characteristics level of said physical storage region in which said data is actually stored, at prescribed times, in accordance with previously established temporal change in said level of storage characteristics required of the storage destination physical storage region by said data, and judging whether or not said levels are matching; and instructing said data to be moved to a physical storage region having said storage characteristics level required by said data at that time, if said judgment result indicates that the levels are not matching;

a fourth feature of the present invention as recited in independent claim 18 wherein movement instructing means for acquiring, at prescribed times, the level

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of storage characteristics in the storage destination required by the data at that time, for each data item managed by said data storage destination managing means, from said characteristics change managing means, further acquiring the level of storage characteristics of said physical storage region in which said data is actually stored, from said physical storage region characteristics managing means, in accordance with information for said logical storage region associated with said data in said data storage destination managing means, and information relating to the association between the logical storage regions and the physical storage regions managed by said storage device, comparing said respective levels, and issuing an instruction to said storage device for the logical storage region in which said data is stored to be moved to said physical storage region providing said required storage characteristics; and

a fifth feature of the present invention as recited in independent claim 20 including comparing the level of the storage characteristics of a storage destination required by the data at a particular time, for each data item, at prescribed times, on the basis of the timing thus established, with the level of the storage characteristics of said physical storage region in which said data is actually stored, and if said levels are not matching, then it sends an instruction for said data to be moved to said physical storage region providing said required storage characteristics, to the storage device having said physical storage region in which said data is actually stored.

The references considered most closely related to the claimed invention are briefly discussed below:

U.S. Patent No. 5,893,139 (Kamiyama) shows a storage system having a plurality of physical storage regions, physical storage region characteristics managing means, characteristics-change managing means, and movement instructing means to move data according to the characteristics of the physical storage and the characteristics of the data to be stored. The storage system further has logical/physical mapping information storing means that is updated after movement. The storage characteristics include access speed and frequency. (See, e.g., Abstract, Figures, column 4, lines 28-45 and 59-65, column 5, lines 7-49, and column 7, line 60, through column 8, line 29.) However, unlike the present invention, Kamiyama does not show that the required storage characteristics for the stored data are previously determined. More particularly, Kamiyama does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 11, the above described third feature as recited in independent claim 17, the above described fourth feature as recited in independent claim 18, and the above described fifth feature as recited in independent claim 20, in combination with the other limitations recited in each of the independent claims.

U.S. Patent 6,032,224 (Blumenau) shows a system for managing a plurality of physical storage units with different access speeds including logical/physical mapping information storing means with associations between

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the logical storage regions and the physical storage regions, and data movement means, such that the logical/physical mapping information is updated to correspond to associations after movement. (See, e.g., Abstract, Figures, column 3, lines 13-65, and column 5, lines 5-49.) Unlike the present invention, Blumenau does not show the existence of a previously determined temporal change in the level of storage characteristics required by the stored data. More particularly, Blumenau does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 11, the above described third feature as recited in independent claim 17, the above described fourth feature as recited in independent claim 18, and the above described fifth feature as recited in independent claim 20, in combination with the other limitations recited in each of the independent claims.

U.S. Patent No. 6,189,001 (McGovern et al.) discloses a storage system with a plurality of physical storage regions, physical storage region characteristics managing means, characteristics change managing means, and movement instructing means to move stored data. (See, e.g., Abstract, Figures, and column 7, lines 1-23.) Unlike the present invention, McGovern et al. do not show logical/physical mapping information storing means that gets updated after movement of data. More particularly, McGovern et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 11, the above described third feature as

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recited in independent claim 17, the above described fourth feature as recited in independent claim 18, and the above described fifth feature as recited in independent claim 20, in combination with the other limitations recited in each of the independent claims.

U.S. Patent Publication No. 2002/0144076 (Yamamoto et al.) discloses a storage device with a plurality of physical storage regions and a logical/physical mapping information storing means with associations between the logical storage data and the physical storage regions and data movement means, such that the logical/physical mapping information gets updated upon movement of data. (See, e.g., Abstract, Figures, and paragraphs 20, 44-49, 146, 147, 149, and 154.) In contrast to the present invention, Yamamoto et al. does not show a previously-determined temporal change in the level of storage characteristics of the stored data nor do they mention a comparison action triggered at prescribed times. More particularly, Yamamoto et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 11, the above described third feature as recited in independent claim 17, the above described fourth feature as recited in independent claim 18, and the above described fifth feature as recited in independent claim 20, in combination with the other limitations recited in each of the independent claims.

U.S. Patent Publication No. 2003/0225801 (Devarakonda et al.) shows a storage system including a plurality of physical storage regions, physical

storage region characteristics managing means, characteristics change managing means, and movement instructing means. The system includes maps for a specific combination of logical attributes associated with specific data. (See, e.g., Abstract, Figures, and paragraphs 22, 23, 25, 36, 52, and 72.) Unlike the present invention, Devarakonda et al. does not show comparing means between the required storage characteristics and the provided storage characteristics nor do they disclose the change in the logical/physical mapping means upon movement of data. More particularly, Devarakonda et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 11, the above described third feature as recited in independent claim 17, the above described fourth feature as recited in independent claim 18, and the above described fifth feature as recited in independent claim 20, in combination with the other limitations recited in each of the independent claims.

U.S. Patent Publication No. 2003/0229698 (Furuhashi et al.) shows a data allocation method between a plurality of physical storage regions having physical storage region characteristics managing means, characteristics managing means required by the data to be allocated, and data storage destination managing means that creates associations between physical storage regions and logical storage data. (See, e.g., Abstract, Figures, and paragraphs 15, 17, 38, 40, 44, 45, 55, and 78.) However, unlike the present invention, Furuhashi et al. does not show a previously determined temporal change in the

level of storage characteristics of the stored data, nor do they disclose a movement instructing means to change the location of the data after being allocated. More particularly, Furuhashi does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 11, the above described third feature as recited in independent claim 17, the above described fourth feature as recited in independent claim 18, and the above described fifth feature as recited in independent claim 20, in combination with the other limitations recited in each of the independent claims.

U.S. Patent Publication No. 2004/0123180 (Soejima et al.) shows a storage apparatus with a plurality of physical storage regions, physical storage characteristics managing means, characteristics change managing means, and movement instructing means to move stored data based on the required level of storage characteristics in comparison to the provided level of storage characteristics. The comparison is effected at prescribed times. (See, e.g., Abstract, Figures, and paragraphs 72, 73, 77, 78, and 121.) In contrast to the present invention, Soejima et al. does not show the stored data having a previously-determined level of storage characteristics changing with time, nor do they show the existing logical/physical mapping means being updated as a result of data movement. More particularly, Soejima et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present

invention as recited in independent claim 11, the above described third feature as recited in independent claim 17, the above described fourth feature as recited in independent claim 18, and the above described fifth feature as recited in independent claim 20, in combination with the other limitations recited in each of the independent claims.

U.S. Patent Publication No. 2004/0243692 (Arnold et al.) discloses a method of allocating storage resources between a plurality of physical storage regions including a physical storage region characteristics managing means, characteristics change managing means for previously determined user-defined storage characteristics, and movement instructing means to move stored data after comparing the required storage characteristic with the provided storage characteristic by the physical storage region. The comparison is affected periodically. The system includes physical/logical mapping means. (See, e.g., Abstract, Figures, and paragraphs 21, 23, 24, 26, 28, 37, 40, and 42.) However, unlike the present invention, Arnold et al. does not show that the predetermined required storage characteristic changes in time, nor do they disclose the change in the logical/physical mapping means according to the data movement. More particularly, Arnold et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 11, the above described third feature as recited in independent claim 17, the above described fourth feature as recited in independent claim 18, and the above

described fifth feature as recited in independent claim 20, in combination with the other limitations recited in each of the independent claims.

U.S. Patent Publication No. 2005/0027754 (Gajjar et al.) shows a system for storage management wherein the system includes a plurality of physical storage devices, characteristics change managing means, data storage destination managing means that creates mapping between logical and physical storage regions, and movement instructing means to move stored data when the storage characteristics levels do not meet the required levels. (See, e.g. Abstract, Figures, and 30, 32, 34, 44, 46, 47, 53, and 57.) Unlike the present invention, Gajjar et al. does not disclose the comparison of the required and provided levels of storage characteristics to be done at prescribed times, nor do they show the change in the logical/physical mapping means upon the instructed movement. More particularly, Gajjar et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 11, the above described third feature as recited in independent claim 17, the above described fourth feature as recited in independent claim 18, and the above described fifth feature as recited in independent claim 20, in combination with the other limitations recited in each of the independent claims.
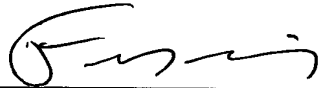
Therefore, since the references fail to disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in

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independent claim 11, the above described third feature as recited in independent claim 17, the above described fourth feature as recited in independent claim 18, and the above described fifth feature as recited in independent claim 20, in combination with the other limitations recited in each of the independent claims, it is submitted that all of the claims are patentable over the cited references.

In view of the foregoing, Applicant requests that this Petition to Make Special be granted and that the application undergo the accelerated examination procedure set forth in MPEP 708.02 VIII.

Respectfully submitted,

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